

## SOIL SURVEY OF GILES COUNTY, TENNESSEE.

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### DESCRIPTION OF THE AREA.

Giles County is situated in the south-central part of Middle Tennessee adjoining the Alabama line. It originally occupied a nearly rectangular area extending 22 miles east and west and 30 miles north, but the transfer of several square miles from the northeastern corner to Marshall County has given that portion an irregular outline. It is bounded on the north by Maury and Marshall counties, on the east by Marshall and Lincoln counties, on the south by Alabama, and on the west by Lawrence County.

The county includes portions of the two physiographic divisions commonly known throughout Middle Tennessee as the Highland Rim

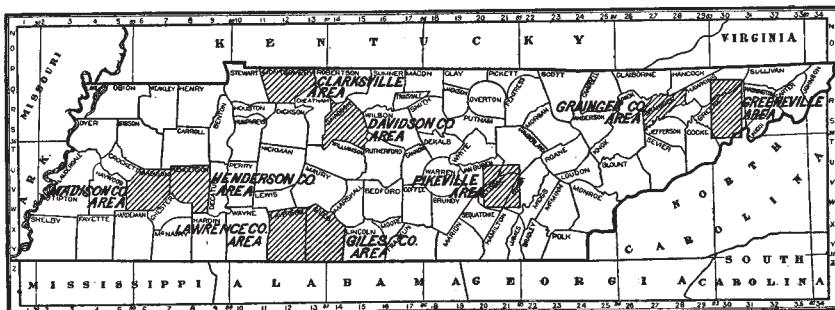


FIG. 25.—Sketch map showing location of the Giles County area, Tennessee.

and the Central Basin. At the junction of these two divisions much of the county is rough and broken. The range in elevation is from 600 to 1,000 feet above sea level. The county is drained by Elk River and its tributaries, the principal one being Richland Creek. Elk River enters the county from the east at a point about 8 miles north of the State line and follows a general southwest course, leaving the county near the center of the southern boundary line. Richland Creek enters the county near the northeast corner and flows west to Buford, where it is joined by one of its principal tributaries, Richardsons Fork, and turns south, following first a southwest then a southeast course to its junction with Elk River near the southern boundary of the county. These streams flow through broad valleys with low, rolling hills. Toward the sources of the tributary streams the hills become higher and steeper and at the headwaters the country

is very rough and broken, presenting a variation in elevation of 150 to 250 feet.

The first settlement was made near the mouth of Richland Creek in 1807. Settlers from the eastern part of the State, North Carolina, and Virginia came in rapidly and the county was established by the State legislature in 1809. Provision was made to locate the county seat near the center of the county. The present site of Pulaski was selected in 1810 and the town was founded the following year. The first settlers located in the valleys of Elk River and Richland Creek and this region was developed quite rapidly, while the rougher portion of the county along the west side received little attention until years later. The county has a large negro population at the present time. There has been very little immigration for many years and the greater proportion of the inhabitants are descendants of the first settlers. In 1900 the population was 33,035.

Pulaski, the county seat, is situated near the center of the county on the Louisville and Nashville Railroad. It is a thrifty business place, with a population of about 4,000. Lynnville, the second town in importance, is in the northern part of the county on the Louisville and Nashville Railroad. It has a population of about 500. Buford, Reynolds Station, Riversburg, Wales, Aspen Hill, and Prospect are other stations situated on the railroad. Elkton, in the southeastern part of the county, on Elk River, is a thrifty village nearly as large as Lynnville. Bethel, Minor Hill, Bodenham, Campbells-ville, Brickchurch, Diana, Pisgah, Bunker Hill, and Bryson are other interior trading points.

The Louisville and Nashville Railroad crosses the country from north to south near the center, making it possible for most of the farmers to reach a shipping point within a distance of 10 miles or less. The county has over 800 miles of roads. Forty-five miles are toll pikes and about 450 miles are under county control. Of the latter about 50 miles have been surfaced with gravel and are as well kept as the toll pikes.

Beds of excellent gravel are found along all the streams and there is an abundance of limestone and other rocks suitable for road building in all parts of the county. With this unlimited supply of material good roads can be built at a relatively low cost.

The county is about 65 miles south of Nashville, from which it receives most of its supplies. Some of the products are marketed there, but a great deal is shipped to small markets. Milling companies in the county and at Columbia, in Maury County, use a considerable portion of the corn crop, although much corn is shipped to small towns in Alabama and other States farther south. The lumber output of the county at the present time is quite large.

## CLIMATE.

The climate of this region is very favorable for general agriculture, and it is possible to grow a wide range of crops. The summers are long, and during July and August there is usually a period of hot weather lasting several weeks when the temperature is seldom less than 80° F. The winters are mild, with very little extreme cold. Occasionally the thermometer falls to zero or below, but periods of low temperature are of short duration.

The tables below consist of data compiled from the records of the Weather Bureau station at Lynnville in the northern part of the county. From the first table it will be seen that there is an average period of six and a half months free from frost, although in one instance (that of 1899) this time was shortened by nearly a month. The annual rainfall, 53.55 inches, is ample for all agricultural purposes and is evenly distributed throughout the year.

*Dates of first and last killing frosts at Lynnville.*

	Last in spring.	First in fall.		Last in spring.	First in fall.
1898 .....	Apr. 8	Oct. 23	1902.....	Apr. 8	Oct. 29
1899 .....	Apr. 11	Sept. 27	1903.....	Apr. 5	Oct. 25
1900 .....	Apr. 1	Nov. 4	1906.....	Apr. 2	Oct. 11
1901 .....	Apr. 4	.... do .....	Average.....	Apr. 6	Oct. 22

*Normal monthly and annual temperature and precipitation at Lynnville.*

Month.	Temper- ature.	Precipi- tation.		Month.	Temper- ature.	Precipi- tation.
January.....	38.4	4.94	August .....	77.3	4.14	
February .....	40.1	5.20	September.....	70.9	3.80	
March .....	49.6	6.28	October.....	60.0	2.63	
April.....	58.3	4.46	November.....	48.6	3.44	
May.....	58.4	4.35	December .....	41.0	4.71	
June .....	75.6	4.36	Year.....	58.9	53.55	
July.....	78.3	5.24				

## AGRICULTURE.

The early settlers in Giles County were a long distance from any market, and the inadequate methods of transportation made it necessary to produce at home nearly everything needed by their families and to raise for export only such things as could be easily transported for long distances. These conditions resulted in the growing of a wide range of crops. Besides the general farm and garden crops, flax, hemp, indigo, and rice were grown. Cotton was early introduced, as is shown by the establishing of a gin at Lynnville in 1811. Not much cotton was grown for market, however, until after the

close of the war of 1812. Much of the early product was sold without being ginned. Tobacco was cultivated for the market from 1816 to 1821, when declining prices caused its production to be discontinued. Hemp was grown for the market from 1811 to the close of the civil war. These early products were shipped out by means of flat-bottom boats, built along Richland Creek and Elk River and floated down stream to the distant market. This practice was discontinued about 1840. The dense undergrowth of cane in the forest afforded an abundance of pasture and stock ranged at liberty over the country. Until the commencement of the civil war cattle raising was the most remunerative industry in the county.

The completion of the Louisville and Nashville Railroad across the county about 1860 made it possible for the farmers to ship their products much quicker than had been done and to obtain elsewhere commodities it had been necessary to produce for themselves theretofore. The change in the agricultural conditions of the county following the civil war was not as marked as in many sections of the South.

At the present time general farming is the rule. On the Hagerstown soils nearly every farmer cultivates several crops and keeps some live stock. The conditions on the Clarksville soils are not as good. Corn and cotton and a few acres of wheat or an occasional patch of cowpeas are the usual crops. Very little live stock is kept.

Corn is the principal crop, the acreage planted to it always being greater than that in wheat and cotton, the crops next in importance. In 1899 there were 85,294 acres in corn, while the total for wheat and cotton was only 48,691 acres. The average yield of corn for the county is a little over 21 bushels per acre. According to the census of 1900 the total acreage in wheat for the county was 32,226, with an average yield of slightly over 8 bushels per acre, while in cotton there were 16,465 acres producing an average yield of three-eighths bale per acre. Better prices since then have caused an increased acreage in cotton, and at the present time it will nearly equal that of wheat. Oats are grown to a limited extent, but do not form one of the important crops of the county. Clover is well adapted to the soils of the county, but owing to the ravages of a fungous disease in recent years little is now sown.<sup>a</sup> Cowpeas take its place largely both as a hay crop and a soil renovator. There is a large acreage of sorghum, millet, and other grasses cut for hay each year. Vegetables and small fruits are grown for local use. Apples and peaches do very well on the Clarksville soils, but owing to the damage done by late spring frosts are an uncertain crop.

In the valleys the live-stock industry is quite important. There is very little full-blood stock, but the breeds of both cattle and hogs

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<sup>a</sup> Bulletin 75, Tennessee Agricultural Experiment Station.

have been improved until they compare favorably with the grade stock of other sections of the country. Most of the cattle have been bred toward the beef type, but dairying has received some attention and a creamery is operated at Pulaski. On the Highland Rim less care has been taken and the native breeds predominate.

In the valleys the adaptation of the different soils to different crops is recognized to some extent. The bottom lands are planted largely to corn. The Hagerstown loam and Davidson loam are planted to cotton and general crops, while the steeper slopes of the Hagerstown stony loam are used largely for grazing. Little attention is given to selection of crops best suited to the Clarksville soils.

Very few of the farmers practice a systematic rotation, although the injurious effects of growing the same crop continuously on a given piece of land are generally recognized and most of them change their crops from field to field without following any regular order.

Improved methods are in evidence over a large part of the county. Many of the farms are equipped with riding plows, disk harrows, binders, and other modern farm machinery. The farm dwellings are well built, and there are many handsome country homes scattered over the county. The outbuildings are not so well kept. Work stock is usually well cared for, but owing to the mild winters cattle are frequently allowed to go without shelter. Most of the farms are inclosed with good fences. The use of wire for this purpose is becoming quite general.

The greater part of the work on the farm is performed by the owner or tenant. Where labor must be hired, negroes are usually engaged and are fairly efficient. Some difficulty is experienced in getting help, as the phosphate mines in this and adjoining counties pay higher wages than can be obtained on the farm. Farm laborers receive from \$15 to \$20 a month. A house is usually furnished the man and his family and he is given firewood and a small garden.

According to the Twelfth Census the average size of farms in the county is 79.7 acres, and 49.3 per cent of the farms are operated by owners. There are many holdings, however, of 200 to 500 acres. These large farms are operated wholly or in part by tenants or shares. On many farms the tenant furnishes everything and receives two-thirds of the crop, and in other cases the landlord furnishes half and the tenant half and each receives half the crop.

According to the Twelfth Census, Giles County has 340,702 acres in farms which, together with the improvements, except buildings, have a total value of \$4,445,400, or an average value of \$13.05 per acre. However, the land values vary widely, ranging from \$2 or \$3 to \$100 an acre, depending largely on the difference in the producing power of the different soil types in the county.

The greatest need is an increase in live-stock production, so that the grain and hay can be fed on the farm and the manure returned

to the soil, allowing only the finished products in the form of meat, butter, etc., to go on the market. By doing this the crop value of the basin soils could be maintained indefinitely, and under good management their producing power could be increased. On the Highland Rim organic and other manures are more necessary than on the bottom soils.

The subject of rotation of crops is one to which the farmer should give greater attention. Each farmer can adopt a system especially suited to his needs, but every rotation should include three things—a cultivated crop, a hay crop, and pasture.

#### SOILS.

The region occupied by Giles County was in past geologic time part of a plateau which extended far beyond the limits of this survey. The surface of this plateau was made up of the St. Louis limestone<sup>a</sup> and the Tullahoma formation occurring at the base of the Carboniferous system. During a long period of time active erosion has been going on, cutting away the plateau and exposing the underlying rocks as far down as the Lebanon limestone in the Lower Silurian. Only a remnant of the original plateau now remains. This is known as the Highland Rim of Tennessee and has an elevation of 900 to 1,000 feet above sea level. The older streams have nearly reached their base level of erosion and have developed broad valleys with gentle slopes and low, rolling hills, while large areas of bottom land have been built up along their courses. The smaller streams are still actively at work and extend back into deep, narrow valleys, separated by rugged, irregular, and very much broken ridges whose crests reach nearly or quite to the elevation of the original plateau. Where these conditions exist the country presents a rough, broken appearance.

The soils of the county fall naturally into two main divisions, the residual and alluvial. The former, covering by far the greater part of the county, are the result of the disintegration and decomposition of the various rocks. The alluvial soils consist of reworked material carried down by water and deposited as bottom lands along the streams. The residual soils fall into two quite distinct groups owing to a marked difference in the parent rock from which they are derived.

The members of the Carboniferous system consist of impure silicious and cherty limestones which give rise to the Clarksville series. The rocks occupying the surface of the plateau have weathered into a deep gray to yellowish silt loam containing very little rock fragment. This

<sup>a</sup> The geological names used here are those used for equivalent formations in the Columbia Folio of the U. S. Geological Survey.

has been called Clarksville silt loam. Where the St. Louis limestone contained a relatively small percentage of impurities decomposition was more complete, producing a red soil—the Decatur silt loam. Where these formations were subject to erosion much of the fine earth was carried away, leaving an accumulation of rock fragments and cherty material incorporated in the soil on the steep slopes. This has given rise to the Clarksville stony loam. This type covers a large part of the county, occurring as rough, broken ridges, and in deep narrow valleys.

The lower lying Silurian formations consist of nearly pure limestone, from which the Hagerstown series is derived. Farther down the valleys and around the points of projecting ridges where the Silurian rocks are exposed below the Carboniferous, erosion has also been active, the finer material has been removed to some extent, and another stony type, the Hagerstown stony loam, has resulted. This type usually occurs as a band extending around the base of hills and up the valleys. At several points in the central and southern parts of the county the limestone from which the Clarksville soils are derived has been entirely removed and the Hagerstown stony loam reaches to the tops of the ridges.

Passing out into the broad valleys along the large streams, where the topography is less rough and broken, erosion has been less severe, the soil is deeper, and contains few rock fragments. Where this material has been derived entirely from the limestone it is called Hagerstown loam. At several points in the eastern and southern parts of the county there is a fine-grained brown sandstone and brown sandy shale interbedded with the limestone. These rocks have exerted a modifying influence on the soil to such an extent as to produce another type described as Davidson loam.

The large streams have built up along their courses rich alluvial lands, called Huntington silt loam. Passing up the tributary streams, the bottoms become narrower and are modified by an accumulation of gravel brought down from the adjoining hills. This type is known as Huntington gravelly loam.

The names and extent of the several types of soil are given in the following table:

*Areas of different soils.*

Soil.	Acres.	Per cent.	Soil.	Acres.	Percent.
Clarksville stony loam.....	161,408	41.0	Huntington gravelly loam...	14,464	3.5
Hagerstown stony loam .....	88,072	21.2	Rough stony land .....	6,656	1.7
Hagerstown loam.....	58,888	13.7	Decatur silt loam .....	960	.3
Huntington silt loam.....	36,928	9.4	Guthrie silt loam .....	128	.1
Davidson loam .....	20,352	5.2	Total.....	393,216	-----
Clarksville silt loam.....	15,360	3.9			

## HAGERSTOWN LOAM.

The soil of the Hagerstown loam to a depth of 10 inches is a dark-brown silty loam which in some cases becomes quite heavy, approaching a clay loam. The subsoil varies from a brown or reddish-brown to yellow clay loam, which frequently grades into a clay below 2 feet. The soil usually contains sufficient humus to make it loose and mellow when properly cultivated. If plowed when wet it is likely to clod.

The type is found in the central and southern parts of the county, where it occupies the less broken portions of the Richland Creek and Elk River valleys. It occurs as low, rolling hills and gentle slopes at the foot of steep hills. The topographic features are such as to insure good natural drainage, though very little erosion takes place.

The Hagerstown loam is a residual soil derived from the weathering of massive gray and blue limestone of Silurian age. Most of this limestone contains phosphate, and in some cases the quantity is so great that beds of commercial phosphate are left as a residue from the weathered rock. The soil is naturally rich in phosphate and is locally known as phosphate land.

This soil was originally covered with a heavy timber growth of oak, elm, hickory, walnut, and other hardwoods, beneath which was a dense growth of cane. The greater portion of the Hagerstown loam has been under cultivation for years, and very little of the original forest now remains. It is an ideal soil for general farming; and all of the standard crops can be grown to advantage. Corn yields 25 to 40 bushels per acre, wheat 15 to 25 bushels, and cotton one-half to three-fourths bale per acre.

This soil should be plowed at least 8 inches deep, and the occasional use of a subsoil plow to loosen it to a greater depth would doubtless prove beneficial. Commercial fertilizers are not needed. There is a tendency to keep the fields in cultivated crops too long. Some rotation should be practiced which would include cowpeas or clover, so as to avoid the loss of organic matter.

Farms on this type range in value from \$25 to \$60 an acre, according to location and character of improvements.

The average results of mechanical analyses of samples of soil and subsoil of the Hagerstown loam are given in the following table:

*Mechanical analyses of Hagerstown loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
18139, 18141 .....	Soil.....	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
18140, 18143 .....	Subsoil .....	0.7	3.1	1.4	5.6	9.3	55.8	23.8
		2.2	5.0	1.3	5.5	6.8	44.0	34.4

## DAVIDSON LOAM.

The surface soil of the Davidson loam consists of 8 to 10 inches of brown to reddish-brown loam. It usually contains a noticeable quantity of fine sand, which in a few cases causes it to approach a fine sandy loam. The subsoil is a heavy reddish-brown loam, grading into a clay loam.

This is one of the less extensive types of soil in the county. The principal areas are found in the northeastern part in the vicinity of Brickchurch, extending west to Buford, and in the southern part in the Elk River Valley. It is closely associated with the Hagerstown loam and occupies the same topographic position. It is more easily injured by erosion, and a few neglected places have been damaged in this way. Like the Hagerstown loam, it is a residual limestone soil, but in this case a fine brown sandstone and reddish-brown sandy phosphatic shale are interbedded with the limestone. The modifying effect of these rocks produces the difference between the soils.

The native growth and crops cultivated on the Davidson loam are the same as on the Hagerstown loam. There is very little difference in crop yields on the two types. The Davidson loam is said to be the first to suffer from drought during long periods of dry weather. It is perhaps better suited for truck crops, but neither soil can be considered as ideal for this purpose.

The average results of mechanical analyses of this type of soil are shown in the following table:

*Mechanical analyses of Davidson loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
18123, 18125 .....	Soil .....	0.3	3.4	4.9	19.3	6.4	49.9	16.1
18124, 18126 .....	Subsoil .....	.5	3.3	4.3	13.7	5.7	47.6	24.6

## HAGERSTOWN STONY LOAM.

The Hagerstown stony loam consists of 8 inches of heavy, brown silty loam overlying a light-brown or yellow clay loam or clay, which is usually heavier than the subsoil of the Hagerstown loam. The surface is strewn with fragments of weathered, massive limestone, varying from an inch to a foot or more in diameter. A considerable quantity of this rock fragment is also incorporated in the soil and subsoil. On steep slopes, where the Clarksville stony loam lies above it, angular fragments of chert have crept down upon the Hagerstown stony loam and added to the rock debris on the surface.

This soil is found throughout the eastern and central parts of the county and in a few small areas well toward the west line. It occurs

as rough, broken hills and narrow bands running along the steep valley slopes above the Hagerstown loam. During rains the water flows swiftly down the steep slopes of these hills, and where care has not been taken to protect the surface considerable damage has been done by washing. Because of this, a considerable portion of the type is kept in bluegrass and used for pasture.

Like the Hagerstown loam, this soil is the result of weathering or decomposition of Silurian limestone. Because of its steep, broken surface the fine earth has been carried away more rapidly than from the gentler slopes of the lower valley land, and the more resistant portions of the parent rock have been left. This accumulation of rock fragments has given the soil its present stony character.

The Hagerstown stony loam is adapted to crops much like those grown on the Hagerstown loam. The yields are not quite as large, and more difficulty is experienced in cultivating this soil. Where corn and cotton are grown it is necessary to have the rows follow a nearly level line around the hills to prevent washing. This practice of contour cultivation is quite general and satisfactory, so that terracing is not necessary. While much of this land is used for pasture, it would seem advisable to keep still more of it in grass. The returns from stock raising would doubtless be greater than could be obtained from cultivated crops. Its present value varies from \$15 to \$40 an acre.

The average results of mechanical analyses of fine-earth samples of the soil and subsoil of this type are given in the following table:

*Mechanical analyses of Hagerstown stony loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
18133, 18135.....	Soil.....	2.4	4.2	1.9	4.1	2.5	64.6	20.6
18134, 18136.....	Subsoil .....	2.4	3.8	1.7	3.5	2.8	57.0	28.4

#### CLARKSVILLE STONY LOAM.

The Clarksville stony loam, to a depth of 8 inches, varies from a gray to light-yellow or light-brown loam, usually quite silty, sometimes becoming a silt loam. The subsoil is a yellow to reddish-yellow heavy loam or clay loam. Both soil and subsoil contain a large quantity of angular chert fragments, varying in size from an inch or less to blocks a foot or more in diameter. At the foot of steep slopes there is frequently an accumulation of this broken rock sufficient to prevent cultivation. The subsoil rests upon a mass of broken and partly decomposed rock, which is frequently encountered at a depth of 2 feet.

This is the most extensive soil type in Giles County. It occupies the greater part of the west half of the county, while other extensive

areas are found in the northeast and east-central parts. Smaller isolated areas are found capping high ridges throughout the remainder of the county. In the western part of the county it occupies rough, broken ridges intersected by deep, narrow stream valleys. Farther east the country is still rough and broken, but the Clarksville stony loam is confined to the tops and upper slopes of the ridges, while a band of Hagerstown stony loam occupies the lower valley slopes. The rough, broken topography of this type insures good drainage, and when left unprotected it is damaged by washing.

The Clarksville stony loam is a residual soil derived largely from the weathering of the Tullahoma formation, which is the lowest of the Carboniferous system in this region. This formation consists of siliceous and cherty limestones, with occasionally interbedded layers of shales. It is probable that the St. Louis limestone has also contributed to the formation of this soil.

A large percentage of this soil is still covered with the original forest growth, consisting of several species of oak, poplar (tulip tree), beech, hickory, walnut, elm, rock maple, and an occasional basswood. Corn is the principal crop. Wheat and cotton are also produced in limited quantities. Corn yields 15 to 30 bushels per acre. The yield varies with the position of the type, the lower slopes and bottoms of the narrow valleys being the more productive. Wheat yields from 5 to 15 bushels, and cotton from one-fourth to one-half bale per acre. No rotation is followed on this soil, and after a few years the quantity of organic matter greatly decreases. Hence the yields rapidly diminish and commercial fertilizers are resorted to to keep up the productiveness.

Sweet potatoes, cantaloupes, small fruits, and other truck crops do well. Apple and peach trees also bear well on this soil and produce fruit of good quality. The steeper slopes wash badly after having been cultivated a few years, and will prove more profitable if kept in permanent forest.

The Clarksville stony loam ranges in value from \$5 to \$20 an acre.

The average results of mechanical analyses of fine-earth samples of the soil and subsoil of this type are given in the following table:

*Mechanical analyses of Clarksville stony loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
18117, 18119 .....	Soil .....	1.6	3.3	1.4	8.4	5.0	67.2	17.7
18118, 18120 .....	Subsoil .....	2.8	4.2	1.5	2.8	7.0	59.9	21.5

CLARKSVILLE SILT LOAM.

The soil of the Clarksville silt loam, to an average depth of 10 inches, is a gray to light-yellow silt loam. When dry it has a flour-

like feel, and when wet it is compact and somewhat plastic, being easily puddled, so that it becomes almost impervious to water. The subsoil is usually a compact silt loam resembling the soil but somewhat heavier. It is usually yellow, but in some cases is red or reddish-yellow, and it generally grades into red silty clay below 2 feet. This condition is particularly noticeable in the area near Elkmont Springs in the southeast corner of the county. The type is usually free from stone, though occasionally a limited quantity of chert is found scattered over small areas.

Although the Clarksville silt loam is one of the principal types of soil found on the Highland Rim, it has only a limited distribution in Giles County. Several large areas occur in the western part of the county, occupying the tops of broad ridges, and smaller areas are found in the east-central part on the ridge forming the divide between Pigeon Roost and Buchanan creeks. Another body near Elkmont Springs, in the southeast corner of the county, forms a part of a large area which extends beyond the limits of the survey east into Lincoln County and south into Alabama.

The Clarksville silt loam has a level to gently undulating surface, and is a remnant of a large plateau which at one time extended over this entire region.

Owing to the close, nearly impervious structure of the soil and its nearly level surface the ground water moves very slowly, but as the type occupies the tops of ridges usually less than a half mile in width the surface slope is generally sufficient to carry off drainage water.

This is a residual soil derived from the decomposition of St. Louis limestone and the upper members of the Tullahoma formation. These rocks contained a large amount of siliceous material which has accumulated in the soil. Owing to its nearly level surface very little of the residual material has been carried away by erosion, and the soil mass is much deeper than on the adjacent Clarksville stony loam. Bed rock is seldom encountered nearer the surface than 10 feet, and frequently not until a depth of 50 feet or more has been reached.

The greater portion of the Clarksville silt loam is still wild land covered with a stunted growth of several species of oak, black gum, sweet gum, chestnut, and poplar. Beneath this there is usually a scattered growth of blackberries, huckleberries, and other shrubs, broom sedge, and several wild legumes. Owing to the stunted appearance of the vegetation the areas occupied by this soil are generally known as the "barrens."

The crops generally grown are the same as on the Clarksville stony loam, with yields slightly smaller. In recent years efforts have been made in other parts of the State to use this soil for special crops. Strawberries and other small fruits have been grown successfully. Sweet potatoes do well, and the phase having a red subsoil produces

a Rockyford cantaloupe which is of exceptionally fine quality. The Clarksville silt loam seems to be well adapted to crops of this kind where quality rather than quantity is the feature most desired. Even molasses obtained from sorghum cane produced upon this soil is found to be far superior in quality and color to that obtained from cane grown on the Hagerstown soils.

Owing to the tendency of this soil to pack, a special effort is necessary in handling it to maintain a deep, loose, mellow seed bed. The depth of plowing should be increased to at least 10 inches and an abundance of organic matter should be supplied to keep it in a loose, loamy condition. The best way to accomplish this is to adopt some rotation which will include cowpeas every second year either as a hay crop or as a catch crop planted between the rows of corn or other cultivated crops. The soil generally shows a slightly acid condition, which can be corrected by applying lime at the rate of 2,000 pounds per acre.

The greater portion of the Clarksville silt loam ranges in value from \$5 to \$15 an acre.

The following table gives the average results of mechanical analyses of samples of this soil type:

*Mechanical analyses of Clarksville silt loam.*

Number.	Description.	Fine	Coarse	Medium	Fine	Very fine	Silt.	Clay,
		gravel.	sand.	sand.	sand.	sand.	Per cent.	Per cent.
18111, 18115 .....	Soil.....	1.0	2.6	1.6	3.3	4.6	69.8	16.8
18112, 18116 .....	Subsoil .....	1.0	2.7	1.4	3.1	6.2	64.4	20.7

#### DECATUR SILT LOAM.

The Decatur silt loam consists of 6 to 12 inches of reddish-brown silty loam, underlain by a reddish-brown silt loam grading into a deep-red silty clay. This type is usually free from stone, but in a few instances fragments of chert are found in both soil and subsoil. The Decatur silt loam is usually associated with the Clarksville silt loam. The transition from one to the other is gradual, usually extending over a wide strip.

This type has a limited development in the present survey. A few small areas are found about 2 miles south of Campbellsville in the northwestern part of the county. One area occurs at the top of Anthony Hill, southwest of Pulaski, and others are found near Krapp Springs, in the east-central part of the county and near Elkmont Springs at the southeastern corner. The surface is level to gently undulating, the only noticeable difference from that of the Clarksville silt loam being the presence of occasional sink holes.

Like the latter type it is a residual soil, but it is probably derived entirely from the St. Louis limestone and represents portions of that formation containing less siliceous matter, so that the resulting decomposition has been more complete.

The original forest growth is the same as that found on the Clarksville silt loam, but does not present the stunted appearance so noticeable on the latter type. The principal crops grown are corn, wheat, and cotton. Corn yields 20 to 40 bushels per acre, wheat 10 to 20 bushels, and cotton about a half bale. What has been said in regard to special crops for Clarksville silt loam and methods of handling that soil apply in a general way to this soil as well. The finest Rockyford cantaloupes produced in the State have been grown on farms marking the line of transition from one of these types to the other.

The Decatur silt loam ranges in value from \$10 to \$30 an acre.

The following table gives the average results of mechanical analyses of this type of soil:

*Mechanical analyses of Decatur silt loam.*

Number.	Description.	Fine	Coarse	Medium	Fine	Very fine	Silt.	Clay.
		gravel.	sand.	sand.	sand.	sand.	Per cent.	Per cent.
18129, 18131 .....	Soil.....	0.3	2.2	1.2	4.5	4.0	68.7	18.4
18130, 18132 .....	Subsoil .....	.3	1.6	.9	2.5	1.8	59.2	33.4

HUNTINGTON SILT LOAM.

The soil of the Huntington silt loam is a rich, mellow, dark-brown to chocolate-brown heavy loam to silt loam having an average depth of 12 inches. It contains a greater quantity of humus or organic matter than any other soil in the county. The subsoil is usually somewhat heavier, occasionally becoming a clay loam. It varies in color from light brown or yellow to dark brown, and occasional small areas are found where it is quite black. The high content of humus keeps the soil loose and mellow, so that it is cultivated with greater ease than the neighboring upland types.

This type consists of the bottom lands along Elk River, Richland Creek, Sugar Creek, and their larger tributaries. It occupies a level position from 5 to 15 feet above the normal level of the streams, but much of it is subject to overflow during periods of high water. During the growing season the mellow character of the soil admits of free movement of soil water, while the proximity to the streams insures the rapid removal of surface water, so that the natural drainage is usually sufficient. Occasionally heavy rains in the summer cause flooding for a short time, but this is by no means common.

The Huntington silt loam is of recent alluvial origin and consists of material washed from the adjoining limestone hills and deposited by the streams during periods of high water. Much of it receives a fresh coating of silt and organic matter during the periods of flood each winter and spring.

The type was originally covered with a heavy growth of oak, elm, hackberry, gum, and sycamore, and a dense undergrowth of cane. Practically all of the type is now under cultivation. Corn is the principal crop, yielding from 40 to 70 bushels per acre. Near Pulaski it is used quite largely for pasture and some portions of it are seeded in grass for hay. Wheat is likely to be injured by the winter flooding and is not generally grown. A large vigorous cotton plant is obtained, but the yield of lint is not equal to that secured from the plants on the upland soils.

Commercial fertilizers are not used. The frequent coating of sediment which the Huntington silt loam receives in times of flood in a large measure takes the place of manures, so that it can be cropped continuously for long periods, making it the most valuable type of soil in the county. It has a present value of \$40 to \$80 an acre.

The following table gives the average results of mechanical analyses of a sample of the soil and subsoil of this type.

*Mechanical analyses of Huntington silt loam.*

[Fine earth.]

Number.	Description.	Fine	Coarse	Medium	Fine	Veryfine	Silt.	Clay.
		gravel.	sand.	sand.	sand.	sand.	Per cent.	Per cent.
18153, 18155 .....	Soil .....	0.0	0.3	0.2	1.6	3.7	75.4	18.0
18154, 18156 .....	Subsoil .....	.1	.6	.4	3.1	7.6	64.4	25.3

HUNTINGTON GRAVELLY LOAM.

The Huntington gravelly loam, though variable in texture and color, in the main consists of 10 inches of brown loam or silty loam containing a considerable quantity of gravel, underlain by material having a similar texture but usually lighter in color and containing a larger quantity of gravel. At a depth of 2 to 4 feet a solid bed of gravel and broken rock is encountered. This is frequently cemented together, forming a light gray conglomerate. The gravel content of the soil is quite variable, in some cases being almost lacking in the first 30 inches.

Like the Huntington silt loam, this is a bottom-land type but differs from the former in being confined to narrow strips along the smaller streams. The surface is level or gently sloping from the stream to the foot of the adjacent hills. The valleys are usually

quite narrow with steep sides rising from the margin of the bottom land. The soil of the Huntington gravelly loam is formed by the wash from these hills. Gravel and fragments of rock frequently several inches across have been carried down the steep hillsides by the combined action of water and gravity, accumulating at the bottom and producing the gravelly character of the soil. In the western part of the county where the Clarksville stony loam extends down to the bottom of the valley this type is sometimes found in bottoms an eighth of a mile wide. Here the soil is usually lighter in color, the subsoil sometimes being gray. In other parts of the county where the Hagerstown soils occupy the lower valley slopes the Huntington silt loam extends farther up the streams, leaving the Huntington gravelly loam as very narrow strips near the heads of the valleys.

The native timber growth was the same as that of the Huntington silt loam and the same general crops are grown but the yields are not as large. Cotton, however, does better than on the latter type. Nearly all of the Huntington gravelly loam is under cultivation at the present time. Occurring as it does in narrow strips it is usually combined in farms with other types of soil which control the value of the whole.

The following table gives the average results of mechanical analyses of fine-earth samples of this type of soil:

*Mechanical analyses of Huntington gravelly loam.*

Number.	Description.	Fine	Coarse	Medium	Fine	Very fine	Silt.	Clay.
		gravel.	sand.	sand.	sand.	sand.	Per cent.	Per cent.
18147, 18149 .....	Soil.....	3.7	10.4	4.6	11.9	7.8	41.7	19.4
18148, 18150 .....	Subsoil .....	4.7	9.8	4.6	11.9	7.1	37.0	25.0

ROUGH STONY LAND.

The term Rough stony land has been applied to areas in this county where there are frequent rock outcrops and bed rock is only a few inches below the surface. These areas occur as caps to hills or bands running around the ends of ridges. In some cases they are steep stream bluffs.

These rocky areas generally cover only a few acres, but a few extend over a hundred acres or more. They are found in nearly all parts of the county, being most noticeable in the central and southeastern parts. The Rough stony land is usually associated with the Hagerstown stony loam. A few areas are found in the Clarksville stony loam.

Many of the areas in the central part of the county are covered with a growth of red cedar and are known as Glade land or Cedar glades.

Where there is no cedar the Rough stony land is usually covered with a sparse growth of oak and other hardwoods. Grass grows on the shallow soil and affords some pasture.

#### GUTHRIE SILT LOAM.

The Guthrie silt loam consists of about 7 inches of light-gray silt loam underlain by a grayish-white plastic silt clay. In this county it is confined to one small area in the southeast corner. It occupies a wet, swampy, poorly-drained place included within the Clarksville silt loam and has no agricultural importance.

#### SUMMARY.

Giles County is situated in the south-central part of Middle Tennessee. It includes portions of the Highland Rim and Central Basin. The portion belonging to the Highland Rim is rough and broken, while that of the basin consists of low, rolling hills. The county is drained by Elk River and its tributaries.

The first settlement was made in 1807, the county established in 1809, and the county seat located at Pulaski in 1811. The early settlers came from East Tennessee and North Carolina. There has been little immigration into the county for many years, and most of the inhabitants are descendants of the first settlers. The population in 1900 was 33,035.

The county is traversed from north to south by the Louisville and Nashville railroad. There are over 800 miles of road in the county, about 100 miles being toll pikes and gravel roads.

The climate is favorable for general agriculture. The growing period free from frost is about six and one-half months. The average annual rainfall of 53.55 inches is evenly distributed throughout the year.

The early settlers cultivated a greater variety of crops than is grown at the present time. Cattle were the principal export product. At the present time corn, wheat, and cotton are the most important crops. In the valleys the live-stock industry is quite important. Cattle and hogs have improved in grade until they compare well with stock in other sections.

The adaptation of soils to crops is recognized to some extent. Very few farmers practice a systematic rotation, and crops are changed from field to field without following any fixed order. More attention should be given to crop rotation.

Improved methods of farming are quite generally employed. Many farms are equipped with modern machinery, buildings are well kept, and most of the farms are well fenced.

The greater part of the work on the farm is performed by the owner or tenant. Where extra help is needed negroes are usually employed. Farm laborers receive \$15 to \$20 a month with house and garden.

About half the farms are operated by the owners. Land is usually rented for a share of the crops, two systems being used. When the tenant furnishes everything he receives two-thirds of the crop, and when he furnishes half and the landlord half each receives half the crop.

The average price of land for the county is \$13 an acre, but prices vary from \$2 to \$100 an acre.

The present system of farming tends to lessen yields. More live-stock should be kept, so that crops may be fed and the manure returned to the soil.

The soils of the county, with the exception of the bottom lands along the streams, are of residual origin. There are two general divisions—those of the Highland Rim derived from the siliceous limestones of the Carboniferous system, and the Central Basin soils derived from the massive limestones of Silurian age. Ten types of soil were mapped, including Rough stony land and a very small area of Guthrie silt loam.

The Hagerstown loam is a rich, heavy, brown loam occupying low, rolling hills and gentle valley slopes. It is probably the best soil for general farming in the county.

The Davidson loam is quite similar to the Hagerstown loam, the principal differences being that it has a reddish-brown color and contains a small quantity of sand because of brown sandstone found interbedded with the limestone.

The Hagerstown stony loam is heavier than the Hagerstown loam, contains a large quantity of broken limestone, and occupies steep hillsides. Much of it is used for grazing.

The Clarksville stony loam is a gray to light-yellow or light-brown loam to silty loam, containing a large amount of chert and broken rock. It occupies the tops and steep slopes of rough, broken hills, and is the most extensive soil type in the county. Much of it is still in forest.

The Clarksville silt loam is a gray to light-yellow silt loam found on the broad, level tops of ridges. Only a small part is under cultivation. It is generally regarded as a poor soil. Under proper cultivation, however, it produces excellent truck crops.

The Decatur silt loam is associated with the Clarksville silt loam, the principal difference being that it has a reddish-brown to red color and is a more productive soil.

The Huntington silt loam consists of the bottom lands along Elk River and the larger creeks. It is a very rich, heavy, productive soil, and is cultivated largely to corn.

The Huntington gravelly loam consists of the bottoms along the smaller streams where there has been an accumulation of gravel in the soil.

The Rough stony land consists of areas where there are frequent rock outcrops and bed rock is only a few inches below the surface. These areas are too rough for cultivation. Many of them are covered with a growth of red cedar and are known as Cedar glades.

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